DOCTOR OF PHARMACY PROFESSIONAL DEGREE PROGRAM

Course Title	Credits	Prerequisite(s)
First Professional Year – Fall Semester		
Biomedical Sciences I	4	*None*
Biomedical Sciences II	4	*None*
Drug Informatics	3	*None*
Introduction to Pharmacy	2	*None*
Pharm. Care I	3	*None*
Total Credits	**16**	
First Professional Year – Spring Semester		
Pharmaceutics	4	*None*
Pharmaceutical Chemistry I	3	*Biomedical Sciences I&II*
Pharmacological Therapeutics I	3	*Biomedical Sciences I &II*
Pharm. Sciences Lab	2	*None*
Principles of Pharm. Admin.	2	*None*
Team Building/PBL	1	*None*
Total Credits	**15**	
First Professional Year – Summer Semester		
Introductory Pharmacy Practice Experience I	0	*None*
Second Professional Year – Fall Semester		
Biopharmaceutics	2	*Pharmaceutical Chemistry I, Pharmacological Therapeutics I & Pharmaceutics*
Biostatistics/Research Methods	4	*None*
Pharmaceutical Chemistry II	3	*Biomedical Sciences I and II*
Pharmacological Therapeutics II	3	*Biomedical Sciences I and II*
Pharm. Care II	3	*Pharm. Care I*
Elective (Select 1)	3	*See elective page*
Total Credits	**18**	
Second Professional Year – Spring Semester		
Integrated Therapeutics IA	2	*All courses **prior to** Integrated Therapeutics IA*
Integrated Therapeutics IB	2	*All courses **prior to** Integrated Therapeutics IB*
Integrated Therapeutics IC	2	*All courses **prior to** Integrated Therapeutics IB*
Integrated Therapeutics Lab I	4	*All courses **prior to** Integrated Therapeutics IA*
Pharmacokinetics	4	*Biopharmaceutics, Pharmaceutical Chemistry II & Pharmacological Therapeutics II*
Pharmacoepidemiology & Outcome Res.	2	*Biostatistics/Research Methods*
Elective (Select 1)	3	*See elective page*
Total Credits	**19**	

Course Title	Credits	Prerequisite(s)
Second Professional Year – Summer Semester		
Introductory Pharmacy Practice Experience II	0	*None*
Third Professional Year – Fall Semester		
Integrated Therapeutics IIA	3	*All courses **prior to** Integrated Therapeutics IIA*
Integrated Therapeutics IIB	3	*All courses **prior to** Integrated Therapeutics IIA*
Integrated Therapeutics IIC	3	*All courses **prior to** Integrated Therapeutics IIA*
Integrated Therapeutics Lab II	4	*All courses **prior to** Integrated Therapeutics IIA*
Pharm. Jurisprudence	2	*None*
Pharm. Compounding Lecture & Lab	2	*Pharmaceutics*
Total Credits	**17**	
Third Professional Year – Spring Semester		
Integrated Therapeutics IIIA	3	*All courses **prior to** Integrated Therapeutics IIIA*
Integrated Therapeutics IIIB	3	*All courses **prior to** Integrated Therapeutics IIIA*
Integrated Therapeutics IIIC	3	*All courses **prior to** Integrated Therapeutics IIIA*
Integrated Therapeutics Lab III	4	*All courses **prior to** Integrated Therapeutics IIIA*
Nonprescription Therapeutics	3	*All courses **prior to** Integrated Therapeutics IIIA*
Total Credits	**16**	
Third Professional Year – Summer Semester		
Advanced Pharmacy Practice Experience I	0	*Successful completion of all courses up to, and including, the third year and attaining a Minimum cumulative GPA of 2.50; and, **Successful completion of the Compulsory Comprehensive Examination.***
Fourth Professional Year – Fall Semester		
Advanced Pharmacy Practice Experience II	15	*Successful completion of all courses up to, and including, the third year and attaining a minimum cumulative GPA of 2.50; and, **successful completion of the Compulsory Comprehensive Examination.***
Health Care Ethics[2]	3	*Advanced Pharmacy Practice Experience I*
Total Credits	**18**	
Fourth Professional Year – Spring Semester		
Advanced Pharmacy Practice Experience III	15	*Successful completion of all courses up to, and including, the third year and attaining a minimum cumulative GPA of 2.50; and, **successful completion of the Compulsory Comprehensive Examination.***
Health Care Ethics[2]	3	*Advanced Pharmacy Practice Experience I*
Total Credits	**18**	

[1] *This list of required courses and their pre-requisites is effective beginning academic year 2004-05. The College of Pharmacy faculty approved and revised it on August 16, 2004 and August 23, 2005, respectively. The faculty reserves the right to modify the curriculum, as appropriate, to reflect the contemporary changes in the profession. This list is subject to change without prior notice.*

[2] *HEALTH CARE ETHICS COURSE (3 credits)*
Health Care Ethics course is a required interdisciplinary course. Students are required to enroll in this course either in the Fall or Spring semester of the 4th professional year. It is taught on Wednesdays from 5:00 p.m. to 7:00 p.m. It may be necessary for you to leave your practice site at 4:00 p.m. on Wednesdays to attend. Appropriate arrangements will be made to ensure that you are officially excused from the practice sites.

PROFESSIONAL ELECTIVE COURSES AND THEIR PREREQUISITES

Title	Pre-requisite(s)
Fall Semester	
Research in Pharmaceutical Sciences[3]	- All Department of Pharmaceutical Sciences Courses in first-year (Fall and Spring) - Minimum Cumulative GPA 2.75 - Permission of the instructor
Research in Clinical and Administrative Pharmacy Sciences[3]	- Minimum Cumulative GPA 2.75 - Permission of the instructor
Anions and Cations in Biological Systems	- Pharmaceutical Chemistry I - Pharmacological Therapeutics I
Cult Cong Care-Clin Hlth Prof	- None
Spring Semester	
Research in Pharmaceutical Sciences[3]	- All Department of Pharmaceutical Sciences Courses in first-year (Fall & Spring) - Minimum Cumulative GPA 2.75 - Permission of the instructor
Research in Clinical and Administrative Pharmacy Sciences[3]	- Minimum Cumulative GPA 2.75 - Permission of the instructor
Introductory & Applied Concepts in Health Policy	- None
The History of Pharmacy: How Yesterday Influences Tomorrow	- None
Drugs & Elderly	- Pharmacological Therapeutics I - Biopharmaceutics
Prin. Drug M. & Drg. Utl.	- Completion of all courses in first-year (Fall & Spring) and second-year Fall
Herbal and Complementary Therapy	- Completion of all courses in the First-Year (Fall & Spring and second-year Fall
Pharmaceutical Law and Policy	- None
Cult Cong Care-Clin Hlth Prof	- None

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3The course is offered by several instructors, each with a different section (see Schedule of Course for instructors' names/sections). Enrollment may be limited. Therefore, you must obtain the instructor's permission before registration and you must register in the section assigned to this instructor.

DOCTOR OF PHARMACY PROFESSIONAL DEGREE PROGRAM
COURSE DESCRIPTIONS

First Professional Year—Fall Semester

Biomedical Sciences I (86687-301) *4 Credits*
This course is designed to provide the student with the fundamental knowledge of the general structure and function of the human body. A short introduction to basic cell structure, tissues, human development and physiological control mechanisms & membrane transport is given at the beginning of the course to help the student acquire a better understanding of human anatomy and physiology.

Instruction using the systemic approach has been adopted for this course. This method provides a better correlation among the tissues and organs and their functions of a particular system and between the systems themselves. A systemic approach also promotes the understanding of structure and function of the human body. The lectures are designed to give the student fundamental and essential knowledge of the human body's various organ systems. Slide projections, power point presentations, computer simulations and lecture outlines are used as teaching aids in this course. Work in the laboratory provides students with the opportunity to study prosected cadaver materials, anatomical models and physiological applications. Students are further guided by printed laboratory organization and objectives. *Prerequisite: None.*

Biomedical Sciences II (86688-302) *4 Credits*
An integrated course comprised of topics in biochemistry, microbiology and molecular biology. Selected aspects of the complex nomenclature, spectrum and pathophysiology of diseases and therapeutic options will be discussed; relationship of pathogenic, bacteria, viruses, fungi and parasites to risk factors.

Biochemistry topics in Biomedical Sciences II are designed to introduce pharmacy students to the fundamental principles of biochemistry. The topics are somewhat interspersed with those of the microbiology portion of the course and, whenever possible, the two are integrated. After an initial review of chemistry, the discussion moves from protein structure and function to enzymes and metabolic pathways and finally to cell signaling and the incorporation of genetic information into proteins. The four major classes of biological macromolecules-proteins, carbohydrates, lipids, and nucleic acids-are introduced. The structure and function of enzymes, which are biological catalysts that perform much of the work to break down and build up materials inside cells, are examined. Metabolic pathways such as those of glycolysis, the Krebs cycle, glycogen breakdown and fatty acid –oxidation will be discussed. The mitrochondrial electron transport chain and oxidative phosphorylation, which link the oxidation of electron-rich metabolic intermediates such as NADH and $FADH_2$ to the production of ATP are presented. The biosynthetic pathways by which carbohydrates, fatty acids, and amino acids are made are discussed. Other topics include: the biochemical process by which hereditary genetic information is duplicated (DNA replication) and the processes by which information stored in genes is used to make proteins (transcription and translation). Finally, topics such as nutrition, the response of cells to hormones (signaling), and cancer are discussed. The hope is that his course will give students a molecular-level appreciation of how cells and organisms work. Such an appreciation will be indispensable for understanding drug action and effectiveness.

This knowledge constitutes a foundation upon which students may build as they pursues in depth studies of their chosen discipline, be it an understanding of the more of action of pharmaceuticals, regulation of gene expression, physiology of the cardiovascular system, etc. *Prerequisite: None.*

Drug Informatics (86691-306) *3 Credits*
This course refers to the application of technology in the deliver of drug information services. Drug information services, in turn, include responding to drug information inquiries, conducting medication use evaluations and participating in medication quality assurance programs, such as; monitoring adverse drug reactions, drug and herbal product interactions, and medications errors. This course is intended to introduce students to drug information skills required to deliver pharmaceutical care. Students will be trained to develop the skills to obtain information from various literature and reference sources to answer drug information questions efficiently. Techniques for researching and evaluating drug literature will be covered. Emphasis will be placed on systemic approaches to formulation of responses utilizing both verbal and written communication skills. *Prerequisite: None.*

Introduction to Pharmacy (86689-304) ***2 Credits***
The course serves as an introduction to the study of pharmacy and pharmaceutical sciences and conceptual basis of pharmaceutical care. Various characteristics of the pharmacy profession in the modern American health care delivery system will be introduced. After this course, students should be able to understand foundations for the pharmaceutical sciences and values of pharmacy practice. *Prerequisite: None.*

Pharmaceutical Care I (86690-305) ***3 Credits***
This course is an introductory development course. Quantitative skills necessary for an understanding of the basic and clinical pharmaceutical sciences will be explored. Various techniques necessary in pharmaceutical calculations employed by the pharmacist in formulation, compounding, manufacturing and dispensing of medications will be discussed. The course will also provide the student with the development of skills to recognize errors in prescribing in both oral and written medication orders, basic patient and professional staff communication and basic patient data collection skill. Commonly used equipment and pharmaceutical dosing devices available in a variety of simulated practice settings will be introduced. *Prerequisite: None.*

First Professional Year—Spring Semester

Pharmaceutics (16216-307) ***4 Credits***
The design of the course is based on the integration of the study of physicochemical principles of pharmacy with formulation and preparation of pharmaceutical dosage forms. The integration is done within each main class of pharmaceutical dosage forms. The study of the physicochemical principles of pharmacy serves as a prologue to the materials covered in each section. Then the application of the knowledge of the physicochemical principles of pharmacy to the rational formulation, preparation/compounding, quality control, stability, packaging and storage of pharmaceutical dosage forms follows directly after the study of the physicochemical principles for each module (i.e., each major class of dosage forms). *Prerequisite: None.*

Pharmacological Therapeutics I (16217-308) ***3 Credits***
The course deals with the study and application of physico-chemical properties and the relationship between chemical structure and pharmacological activities of organic medicinal agents of natural and synthetic origin. *Prerequisites: Biomedical Sciences I and II.*

Pharmaceutical Chemistry I (16218-309) ***3 Credits***
The course deals with the study and application of physico-chemical properties and the relationship between chemical structure and pharmacological activities of organic medicinal agents of natural and synthetic origin. *Prerequisites: Biomedical Sciences I and II.*

Pharmaceutical Sciences Laboratory (16219-310) ***2 Credits***
The course deals with the study, application and analysis of physico-chemical principles governing the stability of pharmaceutical dosage systems. *Prerequisite: None.*

Principles of Pharmacy Administration (16221-312) ***2 Credits***
This course is an expansive and in-depth continuation of Introduction to Pharmacy from Block A. It is intended to introduce the student to detail and specific role of the pharmacist by utilizing and applying learned concepts from Introduction to Pharmacy. It will also reinforce the concept of professionalism and use the strategies of PBL in management skills required to deliver pharmaceutical care. It also involves the economic, administrative, and human aspects of pharmacy operations. Emphasis will be placed on principles and delivery of various pharmacy services to patients. Students will be introduced to the various aspects of pharmacy practices such as community, hospital, and ambulatory practice. *Prerequisite: None.*

Team Building/PBL (16220-311) ***1 Credit***
This course is supportive of all other coursework as it seeks to develop independent learners by using teamwork concepts and student-centered learning methodology. The first section of the course includes team-building activities, and the second section is designed to build students' problem based learning skills. Active learning processes are emphasized utilizing small group interactive and problem based learning methodologies. The team-building portion of the course is accomplished using cooperative educational techniques, such as small group assignments/projects as part of a larger class environment. The problem based learning portion employs the use various PBL methodologies

such as case based lecture, and problem based (under the direction of facilitators). *Prerequisite: None.*

First Professional Year—Summer Semester

Introductory Pharmacy Practice Experience I (51409-021) ***0 Credit***
Prerequisite: None.

Second Professional Year—Fall Semester

Biopharmaceutics (87144-313) ***2 Credits***
This course discusses basic concepts in pharmacokinetics (kinetics of drug absorption, distribution and elimination); bioavailability (rate and extent of absorption); influence of physicochemical, formulation, physiologic and disease variables on pharmacokinetics and bioavailability; and rationale for drug and dosage selection and monitoring in patient care. *Prerequisites: Pharmaceutical Chemistry I, Pharmacological Therapeutics I, and Pharmaceutics.*

Biostatistics/Research Methods (87142-316) ***4 Credits***
This course serves as an introduction to the principles of biostatistics, study design and analysis. Students will learn basic statistical methods using contemporary computer-based statistical packages, and the application of statistics to pharmacy-based research. The course will introduce students to the elements of scientific research, the scientific process, and the role of research in clinical practice and pharmaceutical care. After this course, students should be able to understand the key elements of the scientific process and study design, and the application of statistical analysis to this process. *Prerequisite: None.*

Pharmaceutical Chemistry II (87770-335) ***3 Credits***
This is a continuation of Pharmaceutical Chemistry I. The course deals with the study and application of physico-chemical properties and the relationship between chemical structure and pharmacological activities of organic medicinal agents of natural and synthetic origin. *Prerequisites: Biomedical Sciences I and II.*

Pharmacological Therapeutics II (87772-337) ***3 Credits***
This is a continuation of Pharmacological Therapeutics I. The course deals with the study and application of physico-chemical properties and the relationship between chemical structure and pharmacological activities of organic medicinal agents of natural and synthetic origin. *Prerequisites: Biomedical Sciences I and II.*

Pharmaceutical Care II (87141-315) ***3 Credits***
This course is an introductory development course. Quantitative skills necessary for an understanding of the basic and clinical pharmaceutical sciences will be explored. Various techniques necessary in pharmaceutical calculations employed by the pharmacist in formulation, compounding, manufacturing and dispensing of medications will be discussed. The course will also provide the student with the development of skills to recognize errors in prescribing in both oral and written medication orders, basic patient and professional staff communication and basic patient data collection skill. Commonly used equipment and pharmaceutical dosing devices available in a variety of simulated practice settings will be introduced. *Prerequisite: Pharmaceutical Care I.*

Second Professional Year—Spring Semester

Integrated Therapeutics I A (14029-326) ***2 Credits***
Integrated Therapeutics I B (14030-327) ***2 Credits***
Integrated Therapeutics I C (14031-328) ***2 Credits***
This course will be taught by the clinical and basic science faculty together to provide instruction utilizing both didactic and practical experience sessions. The course is organized by organ systems of the human body and various diseases associated with them. Students will learn about the pathophysiology and pharmacotherapy of various disease states that health care practitioners (pharmacists) may encounter in their practice settings. Students will also learn to make appropriate therapy choices, define goals of therapy, and learn to assess whether these goals are being achieved. Students will learn to create, implement and monitor pharmaceutical care plans. A goal of this course is to prepare students with the ability to render pharmaceutical care and participate successfully for the experiential

program.

The course is structured in a modular format. In order for students to achieve the course goals and objectives, a number of teaching methods will be employed. Students will participate in traditional lectures, small group discussions, and practical laboratories to reinforce didactic teaching and web discussions. *Prerequisite: All courses prior to Integrated Therapeutics I.*

Integrated Therapeutics Laboratory I (14032-329) 4 *Credits*

Group facilitated discussion has been proven to be an aid in learning for students in health professions. Integrative Therapeutics Lab I is a separate course from the didactic Integrative Therapeutics I course and is not designed to prepare students to pass exams given as a requirement of Integrative Therapeutics I. The Lab is designed to facilitate the process of team building by making the basic knowledge taught in the didactic course "come alive" in structured case studies lab exercises. Thus, the didactic lecture material will be expanded, reinforced and made practical by the case-based learning method. Cases will cover material taught in prior semesters to ensure adequate understanding of both the basic sciences and clinical application of therapeutics. Practice skills on the key assessment parameters required for optimal pharmaceutical care of a patient will be enforced. Assessment skills covered in the lab are those needed to make effective drug therapy decisions or recommendations and monitor the patient's response to drug therapy. These include interpretation of laboratory information, physical assessment, disease and drug monitoring, and case evaluation. *Prerequisite: All courses prior to Integrated Therapeutics I.*

Pharmacoepidemiology & Outcomes Research (14033-323) *2 Credits*

The Pharmacoepidemiology and Outcomes Research section is an introduction to the evaluation of the scientific studies that supports the rational use of medication use in humans. The goals of this block is to provide opportunities for students to understand the concepts, methods, and applications of epidemiology, pharmacoeconomics, and outcomes studies utilized in clinical settings as well as with to provide tools to critically assess the clinical literature. In addition, the methods for the interpretational and generalization of findings from these studies relevant to medical and pharmaceutical care practice will be introduced by utilizing knowledge developed from the Research Methods/Biostatistics block. Students will be also prepared for problem-based critique sessions in the Integrative Therapeutics blocks. *Prerequisite: Biostatistics/ Research Methods.*

Pharmacokinetics (14215-314) *4 Credits*

At the end of the course, the student should have acquired competency in the selection, design and adjustment of drug dosing regimens to optimize patient therapy on the basis of the patient's age and disease condition and the drug's pharmacokinetic and pharmacodynamic properties. Special emphasis is placed on those drugs with narrow therapeutic windows, which require therapeutic monitoring. *Prerequisites: Biopharmaceutics, Pharmaceutical Chemistry II, and Pharmacological Therapeutics II.*

Second Professional Year—Summer Semester

Introductory Pharmacy Practice Experience II (51474-022) *0 Credit*

Prerequisite: None.

Third Professional Year—Fall Semester

Integrated Therapeutics II A (87766-341) 3 *Credits*
Integrated Therapeutics II B (87767-342) *3 Credits*
Integrated Therapeutics II C (87768-343) *3 Credits*

This course is followed by Integrative Therapeutics I and is taught by clinical and basic science faculty, providing instruction using both didactic and practice-oriented learning experiences. Module A is an Infectious Diseases Module which begins with the first lectures focused on reviewing properties of common antimicrobial agents used for treating acute and chronic infectious diseases. This will be followed by learning characteristics of common infections affecting different organ systems. Appropriate therapy for community acquired infections and hospital acquired infections will be compared. Emphasis will be placed on the epidemiology of infectious diseases (local and world-wide), antimicrobial resistance and preventive strategies. Students learn and apply appropriate pathophysiologic and pharmacotherapeutic concepts and principles in an integrated fashion to establish competent

methodology toward achieving optimal patient outcomes. This includes defining the goals of therapy, selecting appropriate therapy from among available choices, and evaluating and documenting outcomes. Students will gain experience with various pharmaceutical care processes. Upon completion of this course, students should be prepared to participate in offering pharmaceutical care for the infectious diseases and conditions covered in this module. *Prerequisite: All courses prior to Integrated Therapeutics II.*

Integrated Therapeutics Laboratory II (87763-338) 4 *Credits*

The Integrative Therapeutics (IT) Lab II A and B are modular formatted courses which are organized by organ systems. The IT Lab IIA and B courses are intended to provide the student with a review of prescription and non-prescription (OTC) medications and medical devices and health care products commonly encountered in pharmacy practice. The appropriate selection, rational use, therapeutic efficacy and issues, warnings, precautions, contraindications, drug interactions, use in pregnancy and lactation of prescription and non-prescription medications will be studied. In addition, an emphasis will be placed on counseling patients on the selection and proper use of non-prescription (OTC) medications and devices. The course will provide students with opportunities for increasing their problem-solving skills through the use of a modified problem-based learning approach. Students are scheduled to attend two large group sessions each week. Sigler's Drug Cards will be reviewed once each week. *Prerequisite: All courses prior to Integrated Therapeutics II.*

Pharmaceutical Jurisprudence (87765-340) *2 Credits*

The course involves an examination of the laws and regulatory issues pertaining to the practice of pharmacy. Specifically, the course will focus on pertinent sections of the Federal Controlled Substances Act, Food Drug and Cosmetic Act, as well as an overview of the state board of pharmacy acts and rules governing Virginia, Maryland, and the District of Columbia. *Prerequisite: None.*

Pharmaceutical Compounding Laboratory (87771-336) *2 Credits*

The application of the knowledge of Physico-chemical principles to the formulation, compounding, quality control and storage of pharmaceutical dosage forms. *Prerequisite: Pharmaceutics.*

Third Professional Year—Spring Semester

Integrated Therapeutics III A (14208-349) *3 Credits*
Integrated Therapeutics III B (14209-350) *3 Credits*
Integrated Therapeutics III C (14210-351) *3 Credits*

Integrated Therapeutics (IT) III Lecture is the third component in the integrated therapeutics series designed to combine the pathophysiologic and pharmacotherapeutic management of various disease states encountered routinely by pharmacist practitioners. Where appropriate, pharmacotherapeutic modalities that include over-the-counter and/or complimentary and alternative medicines will be reviewed for each disease state. Student knowledge of basic pharmaceutical principles, acquired in IT-I, will be applied to clinical principles of additional organ systems presented in IT-III. This is a team-taught course.

The overall goal of the course is to prepare students to effectively engage in practice as clinicians-in-training during their professional experience program, providing the basis for rendering patient-centered care upon graduation.

IT-III is offered over 17 weeks and is organized into the following four (4) modular courses that follow the organ systems of the human body and their associated diseases: Module A Endocrine/Renal—3 credits; Module B Gastrointestinal/Nutrition—3 credits; Module C Neurology/Psychiatric Disorders—2 credits; and, Module D Disorders of Special Populations—2 credits.

Lectures of disease states or conditions included in each module will address the following for effective medication therapy management: 1) definition; 2) etiology; 3) epidemiology; 4) pathophysiology/ pathogenesis; 5) usual diagnostic parameters; 6) treatment, 7) drug therapy monitoring parameters; 8) pharmacokinetic principles, where appropriate; 9) appraisal of landmark studies for optimal disease state management utilizing concepts learned; 10) plan for individualized patient therapy; and 11) application of pharmacoeconomic principles in providing cost-effective therapies. *Prerequisite: All courses prior to Integrated Therapeutics II.*

Integrated Therapeutics Laboratory III A (14212-353) 4 *Credits*
Integrated Therapeutics Laboratory III B (17495-354) *2 Credits*
Integrated Therapeutics Laboratory III C (17496-357) *2 Credits*
The Integrative Therapeutics (IT) Lab III A and B are modular formatted courses which are organized by organ systems. The IT Lab III A and B courses are intended to provide the student with a review of prescription and non-prescription (OTC) medications and medical devices and health care products commonly encountered in pharmacy practice. The appropriate selection, rational use, therapeutic efficacy and issues, warnings, precautions, contraindications, drug interactions, use in pregnancy and lactation of prescription and non-prescription medications will be studied. In addition, an emphasis will be placed on counseling patients on the selection and proper use of non-prescription (OTC) medications and devices. The course will provide students with opportunities for increasing their problem-solving skills through the use of a modified problem-based learning approach. Students are scheduled to attend two large group sessions each week. Sigler's Drug Cards will be reviewed once each week. *Prerequisite: All courses prior to Integrated Therapeutics II.*

Third Professional Year—Summer Semester

Advanced Pharmacy Practice Experience I (50001-420) *0 Credit*
Prerequisites: Successful completion of all courses up to, and including, the third year; attaining a minimum cumulative GPA of 2.50; and, the successful completion of the Compulsory Comprehensive Examination.

Fourth Professional Year—Fall Semester

Advanced Pharmacy Practice Experience II (80311-421) *15 Credits*
Prerequisites: Successful completion of all courses up to, and including, the third year; attaining a minimum cumulative GPA of 2.50; and, the successful completion of the Compulsory Comprehensive Examination.

Fourth Professional Year—Fall or Spring Semester

Health Care Ethics* (80305-235/11847-235) *3 Credits*
This course introduces students to ethical and to bioethical issues confronting healthcare providers within the practice setting. The course introduces students to how ethical theory and principlism work to critically analyze and construct well concerned responses to ethical dilemmas. By utilizing the Beaubeu Grid method to collect and analyze case information students will refine their critical thinking skills (both verbal and written) as they read, write, discuss, and resolve the case material presented in class. Emphasis on collaborative dialogue between and among the disciplines represents the hallmark of this course. Finally, the course will familiarize students with ethical and legal considerations, patient-provider relationships, professionalism, and the concepts of moral reasoning. *Prerequisite: Advanced Pharmacy Practice Experience I.*

Fourth Professional Year—Spring Semester

Advanced Pharmacy Practice Experience III (13239-422) *15 Credits*
Prerequisites: Successful completion of all courses up to, and including, the third year; attaining a minimum cumulative GPA of 2.50; and, the successful completion of the Compulsory Comprehensive Examination.

** Health Care Ethics and Recitation is a required interdisciplinary course. Students are required to enroll in this course either in the fall or spring semester of the 4th professional year. It is taught on Wednesdays from 5:00 p.m. to 7:00 p.m. It may be necessary for you to leave your practice site at 4:00 p.m. on Wednesdays to attend. Appropriate arrangements will be made to ensure that you are officially excused from the practice sites.*

Electives** (Fall)

Research in Clinical Administrative Pharmacy Sciences (84925-302/84926-302/84928-302/88423-302) *3 Credits each*
Prerequisites: Minimum cumulative GPA of 2.75 and permission of the instructor.

Research in Pharmaceutical Sciences (80317-302/80318-302/80319-302/80320-302/80321-302/84929-302) *3 Credits each*
Prerequisites: All Department of Pharmaceutical Sciences Courses in the first-year (fall and spring); minimum cumulative GPA of 2.75; and, permission of the instructor.

Anions and Cations in Biological Systems (87334-320) *3 Credits*
The course deals with the study and application of physico-chemical properties and the relationship between chemical structure and pharmacological activities of inorganic medicinal agents. *Prerequisites: Pharmaceutical Chemistry I and Pharmacological Therapeutics I.*

Cultural and Congruent Care in Health Professions (15-31-413/ 15032-413) *3 Credits*
This course is designed to help students increase awareness of how the delivery and acceptance of health care may be influenced by social, cultural and environmental factors and increase the delivery of culturally competent and congruent care to individuals, families, groups, communities and institutions. The course will utilize cultural concepts; theories and models; cultural assessment; critical thinking; and evidence-based practice appropriate for developing knowledge. Emphasis is also placed upon the use of the Culturally Competent Model of Care. Students will be able to analyze cultural factors that facilitate/hinder communication. Furthermore, experiential activities and practical applications of the learned classroom material will contribute to life-long learning.
Prerequisites: None.

Electives* (Spring)

Herbal and Complementary Therapy (13076-242) *3 Credits*
Herbal and Complementary Medicines, including phytomedicine, are becoming an integral part of our society and the growing self-medicating trend among consumers. This course is designed to provide students with the background that they need to advise patients on the sensible use of herbs and to promote public health and safety. Emphases will be placed on the need for phytomedicinals as alternative therapies, the safety and efficacy of herbal preparations, and the role of pharmacists in helping consumers select useful and safe herbal products. The regulatory and legislative aspects of marketing and selling phytomedicinals in the U.S. will also be discussed. Readings will include relevant articles and publications. *Prerequisites: Pharmaceutical Chemistry I & II.*

Drugs & Elderly (13228-220) *3 Credits*
This course is an interdisciplinary course designed to sensitize the student to the special physiological, psychological, sociological, and economic aspects of aging. In addition, special attention will be given to specific drug problems and solutions to these problems. *Prerequisites: Pharmacological Therapeutics I and Biopharmaceutics.*

Principles of Drug M. & Drug Utl. (13231-234) *3 Credits*
The course is designed to develop independent skills for the student to apply information on drug monitoring in various health care settings. Actual data will be collected, evaluated, and organized. Drug monitoring skills will be introduced to assist in gathering pertinent information. Communication skills will be applied orally and in a written format. Therapeutic and cost effectiveness are applied in both developed scenarios and live practical situations. Test skills from lectured information. There will be participation in both individual and group activities that must be presented in writing and through verbal skills. *Prerequisites: Completion of all courses in first-year (fall and spring) and second year (fall).*

Pharmaceutical Law and Policy (17488-318) *3 Credits*
The Pharmaceutical Law and Policy course is designed to provide students with an understanding of key legal and policy issues (past and present) associated with and that shape the practice of pharmacy. *Prerequisites: None.*

Research in Clinical Administrative Pharmacy Sciences (13224-202/13233-302/13225-202/13240-303/13226-202/133234-302) *3 Credits each*
Prerequisites: Minimum cumulative GPA of 2.75 and permission of the instructor.

Research in Pharmaceutical Sciences (13361-202/13386-302/13369-202/13387-302/13363-202/13388-302/13376-202/13389-302/13383-202/13390-302/13393-202/13394-302) *3 Credits each*
Prerequisites: All Department of Pharmaceutical Sciences Courses in the first-year (fall and spring); minimum cumulative GPA of 2.75; and, permission of the instructor.

Introductory & Applied Concepts in Health Policy
This elective course provides a broad, introductory overview of general and multidisciplinary health policy concepts at the macro level in the United States and in international affairs, through combined didactic and experiential-based learning. The main goals of the course are for students to become familiar with major policy issues, to gain experience analyzing these issues, and to directly apply that knowledge by engaging in legislative or regulatory processes. The course also includes introduction to focus areas such as Health Disparities, the Aging and Elderly, Mental Health, and Global Health. A significant proportion of the didactic work is innovative and technology-based. Critical thinking and leadership skills should be stimulated to produce a greater awareness of health policy issues, to encourage a more empathetic, interactive and team-oriented health professional, and to become a more visible participant in political process. Writing is an essential tool for thinking and communicating in virtually every profession. Therefore, in this course I will expect you to produce writing that is not only thoughtful and accurate, but also organized, clear, and consistent with the rules of Standard English. If your writing does not meet these standards, I may deduct points or ask you to revise. For assistance with your writing, go to the student section of the Writing across the Curriculum (WAC) website
http://www.cetla.howard.edu/wac/students.aspx
Prerequisites: None

Cultural and Congruent Care in Health Professions (15-31-413/ 15032-413) *3 Credits*
This course is designed to help students increase awareness of how the delivery and acceptance of health care may be influenced by social, cultural and environmental factors and increase the delivery of culturally competent and congruent care to individuals, families, groups, communities and institutions. The course will utilize cultural concepts; theories and models; cultural assessment; critical thinking; and evidence-based practice appropriate for developing knowledge. Emphasis is also placed upon the use of the Culturally Competent Model of Care. Students will be able to analyze cultural factors that facilitate/hinder communication. Furthermore, experiential activities and practical applications of the learned classroom material will contribute to life-long learning.
Prerequisites: None

The History of Pharmacy: How Yesterday Influences Tomorrow
This course is designed to provide a survey of the history of pharmacy as a health discipline with particular emphasis on its development and maturation in the United States. Moreover, the course intends to explore political, social, and economical considerations past, current, and future as they pertain to professional enculturation and pharmacy's progress as a health care discipline.

Please note: This list is subject to change.